

Introduction to Quadratic Relationships

In January of 1848, gold was discovered near Sacramento, California. By the spring of that year, a great gold rush had begun, bringing 250,000 new residents to California.



Throughout history, people have moved to particular areas of the world with hopes of improving their lives.

- In 1867, prospectors headed to South Africa in search of diamonds.
- From 1860 to 1900, farmers headed to the American prairie where land was free.
- The 1901 Spindletop oil gusher brought drillers by the thousands to eastern Texas.

Prospectors and farmers had to stake claims on the land they wanted to work.

1.1 Staking a Claim

Suppose it is the year 2100, and a rare and precious metal has just been discovered on Mars. You and hundreds of other adventurers travel to the planet to stake your claim. You are allowed to claim any rectangular piece of land that can be surrounded by 20 meters of laser fencing. You want to arrange your fencing to enclose the maximum area possible.



Problem 1.1 Maximizing Area

- A.** Sketch several rectangles with a fixed perimeter of 20 meters. Include some with small areas and some with large areas. Label the dimensions of each rectangle.
- B.** Make a table showing the length, width, and area for every rectangle with a perimeter of 20 meters and whole-number side lengths. Describe some patterns that you observe in the table.
- C.** Make a graph of the (*length, area*) data. Describe the shape of the graph.
- D. 1.** What rectangle dimensions give the greatest possible area? Explain.
- 2.** Suppose the dimensions were not restricted to whole numbers. Would this change your answer? Explain.

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